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Manuel Weyman Group, Inc.

Statement of Qualifications - Geothermal Power

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Manuel Weyman Group Inc.

Summary

Manuel Weyman Group, Inc. (MWG) is a consultancy located in Reno, Nevada USA which specializes in geothermal power generation. The company is co-owned by Mr. Fred Manuel and Mr. Roland Weyman, who have extensive and broad engineering and managerial experience within the geothermal industry as well as careers each spanning over forty years. Mr. Manuel and Mr. Weyman work as the consultancy's two employees.

History

After working together on several geothermal projects going as far back as the early 1990's, and most recently for five (5) years on the Patua Geothermal Project in Nevada USA, Mr. Manuel and Mr. Weyman decided to combine their management and technical knowledge and experience to offer superior project management, engineering and technical services to the geothermal industry; thus, Manuel Weyman Group, Inc. was created. MWG was incorporated in the State of Nevada USA in 2016.

Location

MWG's offices are located in Reno, Nevada USA. Reno is considered by many to be an international center for geothermal energy. It is the home to many leading geothermal companies and organizations such as the Great Basin Center for Geothermal Energy. Nevada is one of the leading regions in the world for geothermal power generation. MWG's office is within a day's drive to the majority of the USA's geothermal power plants and major geothermal fields.

Market

From the beginning, MWG's principals have considered the company's market as one that extends around the world, including geothermal areas within Southeast Asia, East and West Africa, Europe, as well as North, Central and South America. MWG has experience working within the international geothermal market. In some cases, MWG works with companies that are relatively new to the geothermal and/or power industry, using their managerial, technical and market experience to assist them in geothermal development efforts.

Philosophy

MWG was created in order to bring value to our clients through cost-effective, timely solutions to our clients' needs. MWG is a small, agile and flexible company. MWG's principals take pride in providing tailored, high quality solutions to the geothermal industry.

Safety and the Environment

Safety and environmental stewardship are always held with the highest regard by MWG.

Project Experience

The principals of MWG have worked on the geothermal projects listed in the table below over the course of their careers, including technical, engineering, construction, project management and executive management roles. MWG's project experience includes all of the major geothermal power generation technologies, including dry (superheated) steam, single and dual flash, binary (including supercritical Organic Rankine Cycle), as well as combined flash and binary cycles.

MWG has experience in both wellfield and power plant development and technologies. Their experience includes projects that utilize geothermal steam and brine with high levels of non-condensable gases (NCG). MWG also has experience with a variety of hydrogen-sulfide abatement technologies.

MWG also has years of experience working at several of California's Imperial Valley (Salton Sea) geothermal projects. This experience allows MWG to understand the technologies and processes required to successfully produce and process very hot super-saline brine (i.e. high total dissolved solids).

Geothermal Project	Description	Location
Coso	270 MW_e (net) dual-flash plant and wellfield	California USA
The Geysers (Calpine)	880 MW_e (net), dry steam wellfield and 19 generating units	California USA
The Geysers (NCPA Unit 2)	110 MW_e	California USA
Salton Sea Units 1, 2, 3, 4 and 5 plus Vulcan, Hoch, Elmore, Leathers	280 MW_e (net); plants and wellfield, extremely high level of geothermal brine solids and corrosivity	California USA
Raft River	9 MW_e binary power plant and wellfield	Idaho USA
Desert Peak	9 MW_e (net) dual-flash plant and wellfield	Nevada USA
Patua	30 MW_e (net) wellfield and supercritical binary power plant utilizing R134a as cycle fluid	Nevada USA
Rye Patch / Humboldt House	Due diligence on partially constructed power plant	Nevada USA
San Emidio	9 MW_e power plant and wellfield	Nevada USA
Soda Lake I	2.75 MW_e (net) binary power plant and wellfield	Nevada USA
Neal Hot Springs	21 MW_e binary power plant and wellfield	Oregon USA
Roosevelt Hot Springs	23 MW_e wellfield	Utah USA
Dieng	60 MW_e (net) wellfield and flash power plant	Java, Indonesia
Patuha	Wellfield drilling and project development	Java, Indonesia
Bali (Bedugal)	Wellfield drilling and project development	Bali, Indonesia
Upper Mahiao	120 MW power plant and wellfield	Leyte, The Philippines
Malitbog	230 MW power plant and wellfield	Leyte, The Philippines
Mahanagdong	180 MW power plant and wellfield	Leyte, The Philippines

Specific geothermal experience of MWG's principals are described in the following sections.

Fred Manuel

Mr. Manuel received his bachelor's degree in mechanical engineering from Vanderbilt University, Nashville, Tennessee USA in 1980. His career spans forty-one years and includes twenty-one years in the geothermal power industry, nine years in the gas-turbine power industry and eight years in oil and gas.

Mr. Manuel joined Chevron Corporation as a drilling engineer, based in New Orleans, Louisiana, working on land and offshore rigs in the Gulf of Mexico area. From 1980 to 1987, he gained hands-on drilling, production, and reservoir engineering experience. In 1987, he took a position as operations engineer at Chevron's Desert Peak Geothermal Project near Reno, Nevada. In 1991, when the project was acquired by CalEnergy Company, Inc., Chevron transferred him to San Ramon, California as an offshore engineer.

In 1991, Mr. Manuel joined CalEnergy as manager of operations at the 270 MW_e (net) Coso geothermal project in California, managing a wellfield exceeding one hundred (100) wells and a power plant facility consisting of nine (9) 30 MW_e (net) turbine-generating units. From 1991 to 1997, Mr. Manuel held increasingly responsible management positions, including the position of Vice President, U.S. Operations. He was then responsible for CalEnergy's geothermal portfolio, which consisted of Coso (270 MW_e), Imperial Valley (280 MW_e), Desert Peak (9 MW_e), and Roosevelt Hot Springs (23 MW well field).

In 1997, Mr. Manuel, still with CalEnergy, relocated to Jakarta, Indonesia, as Vice President and Chief Operating Officer, Asia. He was responsible for geothermal resource development, plant and wellfield engineering, drilling, construction, and environmental compliance, for three project areas of Dieng, Patuha, and Bali (400 MW concessions each) and operations and maintenance for CalEnergy's recently constructed geothermal facilities in the Philippines (~530 MW_e). Mr. Manuel oversaw development, construction, and start-up of the Dieng geothermal project (60 MW_e) in Central Java, Indonesia.

In 1999, Mr. Manuel joined Calpine Corporation as Senior Vice President, Geothermal, relocating from Indonesia to California. He was the senior executive of "The Geysers" geothermal facility, with nineteen (19) generating turbine-generating units and steam wellfields, generating approximately 880 MW_e.

In 2000, Calpine asked Mr. Manuel to take the position of Senior Vice President, Gas Operations. In this position he managed Calpine's portfolio of gas-turbine power plants (82 facilities totaling 20,000 MW_e).

In 2006 Mr. Manuel formed Manuel Energy Inc. In 2007, he relocated to Kuwait, supporting two clients with engineering and construction management on fast-track, design-build gas turbine power projects (five turbine-generators of 60 MW_e each) to meet an emergency need for power in Kuwait.

Relocating back to the USA in 2008, Mr. Manuel joined Advanced Power Projects as Chief Technology Officer / Sr. VP of Engineering, managing engineering of a steam-injection technology for gas turbines.

In 2010, Mr. Manuel joined Gradient Resources, Inc. as Senior Vice President, Engineering and Construction. For the next five years, his focus was on well drilling/testing, engineering, construction, commissioning and operation of the Patua Geothermal Power Project, located near Reno, Nevada.

Mr. Manuel is a licensed Professional Engineer in the field of mechanical engineering, in the State of Nevada, USA.

Roland Weyman

Mr. Weyman received his bachelor's degrees in chemical engineering and chemistry from the University of Colorado, Boulder, Colorado USA in 1979.

Following eleven (11) years of service with the United States Navy, Mr. Weyman joined Magma Power Company (Red Hill Geothermal) as a plant engineer and project engineer at the company's facilities near Brawley, California in 1992. Upon completion of the acquisition of Unocal's Salton Sea facilities (and subsequent purchase by CalEnergy), Mr. Weyman's duties were expanded to all eight (8) geothermal power plants. Over the period assigned, he successfully completed twenty-two (22) capital projects with sole responsibility for planning, design oversight, budgeting, and execution. Concurrently, Mr. Weyman successfully completed four (4) major facility overhauls while acting as Overhaul Coordinator.

In 2000, Mr. Weyman was appointed as project manager for the $57 million expansion of CalEnergy's Vulcan facility at the Salton Sea complex. At the completion of the project through 2003, he continued to serve as a contracts administrator while fulfilling other project management and project engineering roles for the other facilities. Concurrently, Mr. Weyman assumed the role of project manager and contracts administrator for CalEnergy's new Salton Sea Unit 5 facility through 2003.

For the period 2005-2007, Mr. Weyman worked for AMEC, Mining and Metals Division (Phoenix, Arizona, USA) in a variety of engineering and project management roles at several AMEC project sites. Highlights of work completed include lift station design at a surface copper mine (Arizona), pre-commissioning manager at a greenfield gold/copper concentrator facility (Nevada), instrumentation and controls manager for a major refurbishment of a copper/molybdenum concentrator (Arizona), and design of a municipal water system.

For the period 2007-2009, Mr. Weyman continued to work for AMEC as an independent consultant, primarily focusing on geothermal project development including authoring of base specifications for turbine generators, cooling towers, gathering system equipment, and flash separators.

In 2009, Mr. Weyman joined AltaRock Energy as a site coordinator to oversee construction of an experimental project at Northern California Power Authority (NCPA) Unit 2. The project was cancelled due to technical issues.

Following this employment, Mr. Weyman became an independent consultant and immediately began work for Vulcan Power Company (Bend, Oregon USA) in development of several geothermal lease properties in northern Nevada. He was subsequently hired as a Senior Engineer in 2010, when he became responsible for the design, specification, and construction oversight of the Patua binary geothermal plant at Hazen, Nevada.

Summary of Geothermal Services Offered

Project Management

- Lifecycle or targeted project management activities covering key project elements:
  - scope definition
  - schedule definition
  - budgeting
  - contracts
  - change management
  - scope controls
  - recovery planning
  - cost controls
  - provider evaluation
  - stakeholder relations
  - task definition/WBS
  - task duration
  - quality control
  - vendor evaluation
  - communications
  - task sequencing
  - resource analysis
  - cost/value metrics
  - procurement
  - forensics
- Identification, analysis, and management of project risks

Asset Management and Evaluation

- Asset management services
- Due diligence of power generation assets in support of project financings or acquisitions
- Evaluation of assets and management of assets to support restructuring
- Power plant audits (plant and/or management performance)

Power Project Support (Development or Existing Projects)

- Lender's or owner's engineering support
- Project financing and development technical support
- Budget preparation; capital project cost estimation; comparison of alternatives
- Feasibility studies (projects and/or processes)
- Request for Proposal (RFP) processes (preparation, selection, and response evaluation)
- Contract development and negotiation
- Procurement activities (vendor/supplier evaluation, monitoring, quality control)
- Evaluation of systems/equipment alternatives (economic/technical)
- Equipment specification development
- Power cycle analysis and optimization
- Plant instrumentation and control system support
- Plant and/or equipment performance testing

Geothermal Power Plant and Wellfield Services

- Power plant and wellfield management
- Downhole pump selection, evaluation, and monitoring
- Power cycle (binary, flash, hybrid) analysis and optimization
- PV solar integration with existing geothermal operations
- Geothermal well drilling, completion and workover (well repairs) management
- Well testing design, procurement, execution, evaluation and reporting
- Well design and drilling operation technical support

Contact Information

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